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अंतर्वस्तु की पहचान
(दूसरा पुनरीक्षण)

Identification of the Contents of
Industrial Gas Cylinders
(Second Revision)

ICS 01.070; 23.020.35

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Gas Cylinders Sectional Committee had been approved by the Mechanical Engineering Divisional Council. This standard was published in 1967 and subsequently revised in 1981. In this revision the following major changes have been made:

- a) Efforts have been made to classify the gases in non-flammable, flammable category;
- b) UN numbers have been assigned to gases based on International practices, wherever available; and
- c) Colour identification of content of gas cylinders made from aluminium.

It has been usual to specify the contents of gas cylinders by colour marking of the gas cylinders. With the increasing number of gases and mixture of gases used by industry, the number of discreet colours for identifying the gases concerned is not sufficient. Therefore, it has become customary to identify the contents of the gas cylinders by marking the cylinders with the name of the gas and chemical formula in addition to colour-marking of the cylinders and separate standard is maintained for colour coding for medical gas cylinders.

Colour identification of gas cylinders and related equipment intended for medical use has been covered in IS 3933 : 1966 'Colour identification of gas cylinders and related equipment intended for medical use'.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

IDENTIFICATION OF THE CONTENTS OF INDUSTRIAL GAS CYLINDERS

(*Second Revision*)

1 SCOPE

This standard covers the method of marking and colouring industrial gas cylinders both for steel and aluminium cylinder. It does not cover colour coding for medical cylinders.

2 REFERENCES

The standard listed below are necessary adjuncts to this standard. At the time of publication, the edition indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

<i>IS No.</i>	<i>Title</i>
5 : 2007	Colours for ready mixed paints and enamels (<i>sixth revision</i>)

3 IDENTIFICATION MARKING

3.1 Cylinders shall be legibly and durably marked, preferably at the valve end and off the cylindrical part of the body with the:

- a) Chemical formula and the name of the gas it contains; and
- b) In case of mixtures, the chemical formulae, name and proportion of the constituent gases in descending order of magnitude and UN Number.

3.1.1 For gases, such as air and certain fuel gases where the exact chemical composition is not precisely determined, the chemical formula can be excluded, but its common usage name shall be mentioned.

3.1.2 The chemical formulae and U.N. Number of gases (other than Refrigerants) shall be marked in accordance with Table 1 and for refrigerant gases shall be marked in accordance with Table 2, 3, 4, 5 and 6.

3.1.3 Cylinders shall be legibly and permanently marked, preferably at the valve end of the cylinder and shall extend down the cylinder to the shoulder. The

method of marking adopted shall be such that it does not weaken or damage the cylinder.

3.1.4 The dimensions of the lettering and figures shall commensurate with the size of the cylinder and as large as necessary for easy identification.

The characters in marking shall normally be at least 6 mm in height. On cylinders below 140 mm diameter this height may be reduced, but in no case shall the characters be less than 3 mm in height. The indication shall not be of excessive depth.

3.1.5 The colour of the lettering and figures shall contrast against the ground colour of the cylinder and shall be such as not to impair their legibility.

4 COLOUR IDENTIFICATION

4.1 All gas cylinders (other than refrigerant cylinders) shall be painted externally in accordance with Table 7 to provide means for visual identification of the gaseous contents. The colour identification shall consist of a ground colour and may have additional colour on shoulder and also may have additional colour band below shoulder. Generally, the band shall be painted immediately below shoulder unless otherwise specified. The width of the colour band shall be at least 0.25 D where D is the outside diameter of the cylinder shell, shoulder colour band shall be painted round the neck of each cylinder adjacent to valve fitting.

4.2 Colours of cylinders containing refrigerant gases will be as per Table 8, 9, 10, 11.

4.3 Cylinders containing Refrigerant Mixtures will be assigned colour codes in consultation with Statutory Authority.

4.4 Cylinder containing certain gas mixture with specified identification shall be coloured in accordance with Table 12.

4.5 Cylinders containing gases or gas mixtures (other than refrigerant gases) for which exclusive identification is not provided in Table 7, shall be colour-marked in accordance with Table 13.

5 SPECIFIC COLOUR CODE REQUIREMENT FOR ALUMINUM CYLINDERS FOR INDUSTRIAL GASES

5.1 For aluminum cylinders, the following:

- a) For the cylinders with same ground and shoulder colour, only shoulder shall be painted and ground colour shall be omitted;

- b) For aluminum cylinders filled with gas mixtures as per Table 3, the colour band shall be painted just below the shoulder paint; and
c) For the unspecified gas mixtures, the body colour shall be omitted.

Table 1 Name of Gases (Other Than Refrigerant Gases) with Chemical Formulae and UN Number
(Clause 3.1.2)

SI No.	Name of Gas	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)
i)	Acetylene, dissolved	1001	C_2H_2
ii)	Air, compressed	1002	—
iii)	Ammonia (anhydrous or dissolved)*	1005	NH_3
iv)	Argon	1006	Ar
v)	Boron trichloride	1741	BCl_3
vi)	Boron trifluoride (boron fluoride) compressed	1008	BF_3
vii)	Butadiene (vinylethylene, divinyl)	1010	C_4H_6
viii)	Butane*	1011	C_4H_{10}
ix)	Butane (commercial)		—
x)	Butylene	1012	C_4H_8
xi)	Carbon dioxide*	1013	CO_2
xii)	Carbon Monoxide compressed	1016	CO
xiii)	Chlorine	1017	Cl_2
xiv)	Chlorine trifluoride	1749	ClF_3
xv)	Chlorine pentafluoride	2548	ClF_5
xvi)	CNG	1971	CNG
xvii)	Coal gas (town gas, lighting gas) compressed	1023	$H_2 + CO + CH_4$
xviii)	Cyanogen	1026	$(CN)_2$
xix)	Cyanogen chloride	1589	ClCN
xx)	Cyclopropane	1027	C_3H_6
xxi)	Dimethylamine	1032	$(CH_3)_2NH$
xxii)	Dimethyl ether (methyl ether, methyl oxide)	1033	$(CH_3)_2O$
xxiii)	Ethane*	1035	C_2H_6
xxiv)	Ethylamine (aminoethane)	1036	$C_2H_5NH_2$
xxv)	Ethyl chloride (chloroethane)*	1037	C_2H_5Cl
xxvi)	Ethylene*	1962	C_2H_4
xxvii)	Ethylene oxide	1040	C_2H_4O
xxviii)	Fluorine compressed	1045	F_2
xxix)	Helium compressed	1046	He
xxx)	Hydrogen compressed	1049	H_2
xxxi)	Hydrogen bromide, anhydrous	1048	HBr
xxxii)	Hydrogen chloride, anhydrous	1050	HCl
xxxiii)	Hydrogen cyanide	1613	HCN

Table 1 (Concluded)

SI No.	Name of Gas	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)
xxxiv)	Hydrogen fluoride, anhydrous	1052	HF
xxxv)	Hydrogen sulphide	1053	H ₂ S
xxxvi)	Isobutane*	1069	CH (CH ₃) ₃
xxxvii)	Isobutylene	1055	CH ₂ =C(CH ₃) ₂
xxxviii)	Krypton	1056	Kr
xxxix)	Liquefied petroleum gas (LPG)	1075	—
xl)	Methane*	1971	CH ₄
xli)	Methanethiol (methylmercaptan)	1064	CH ₃ SH
xlvi)	Methyl acetylene	3161	CH ₃ C = CH
xlvi)	Methylamine (anhydrous)	1061	CH ₃ NH ₂
xliv)	Methyl bromide (bromomethane)*	1062	CH ₃ Br
xliv)	Methyl chloride (chloromethane)*	1063	CH ₃ Cl
xlvi)	Neon compressed	1065	Ne
xlvi)	Nitrogen*	1066	N ₂
xlvi)	Nitrogen peroxide (nitrogen dioxide)	1067	NO ₂
xlix)	Nitrogen tetroxide (dinitrogen tetroxide)	1974	N ₂ O ₄
l)	Nitrogen Trifluoride	2451	NF ₃
li)	Nitrous oxide	1070	N ₂ O
lii)	Nitrox	1956	—
liii)	Oil gas, compressed	1022	CO = C _M H _N
liv)	Oil gas, liquefied (Z-gas)	1065	CO + C _M H _N
lv)	Oxygen compressed	1072	O ₂
lvi)	Phosgene (carbonyl chloride)	1076	COCl ₂
lvii)	Propane*	1978	—
lviii)	Propylene*	1077	C ₃ H ₆
lix)	Sulphur dioxide	1079	SO ₂
lx)	Sulphur hexafluoride	1980	SF ₆
lxi)	Trimethylamine	1083	(CH ₃) ₃ N
lxii)	Vinyl bromide*	1085	CH ₂ = CHBr
lxiii)	Vinyl chloride*	1086	CH ₂ = CHCl
lxiv)	Vinyl methyl ether (methylvinyl oxide)	1087	CH ₃ OCH = CH ₂
lxv)	Water gas	1080	H ₂ = CO
lxvi)	Xenon	2036	Xe

NOTE* Gases are also used as refrigerant.

- 1 METHYL CHLORIDE – R40,
- 2 ETHYL CHLORIDE – R160,
- 3 METHYL BROMIDE – R40B1,
- 4 VINYL BROMIDE – R140B1,
- 5 VENYL CHLORIDE – R1140
- 6 AMMONIA, IGERANT-R717,
- 7 PROPYLENE-R1270,
- 8 ETHYLENE-R1150,

- 9 PROPANE-R290,
- 10 ETHANE-R170
- 11 ISOBUTANE R-600,
- 12 BUTANE R-600,
- 13 CARBON DIOXIDE R-744,
- 14 NITROGEN R-728,
- 15 METHANE R-50,
- 16 ETHENE (ETHYLENE) R-1150.

Table 2 Name of Low Pressure Refrigerant Gases (Non Flammable) With Chemical Formulae and UN Number

(Clause 3.1.2)

SI No.	Name of Refrigerant Gas	Refrige-Rant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
i)	TRICHLOROMONOFUOROMETHANE	R-11	1029	CCl ₃ F
ii)	OCTAFLUOROPROPANE	R-218	2424	C ₃ F ₈
iii)	VINYL FLUORIDE	R-141	1950	C ₂ H ₃ F
iv)	DIBROMOTETRAFLUORO - ETHANE	R-114B2	3082	C ₂ Br ₂ F ₂
v)	DICHLORODIFLUOROMETHANE	R-12	1028	CCl ₂ F ₂
vi)	BROMOCHLORODIFLUORO METHANE	R-12B1	1974	CBrClF ₂
vii)	CHLOROTRIFLUOROMETHANE	R-13	1022	CClF ₃
viii)	DICHLOROFLUOROMETHANE	R-21	1029	CHCl ₂ F
ix)	TRICHLOROTRIFLUOROETHANE	R-113	3082	CCl ₂ FCClF ₂
x)	DICHLOROTETRA-FLUOROETHANE	R-114	1958	C ₂ Cl ₂ F ₄
xi)	CHLOROPENTAFLUOROETHANE	R-115	1020	C ₂ ClF ₅
xii)	CHLOROTETRAFLUOROETHANE	R-124	1021	CClF ₂ CHF ₂
xiii)	OCTAFLUOROCYCLOBUTANE	R-C318	1976	C ₄ F ₈
xiv)	HEXAFLUOROPROPENE	R-1216	1858	C ₃ F ₆
xv)	ETHYL METHYL ETHER	R-227	3296	C ₃ H ₈ O
xvi)	R-134A 1, 1, 1, 2-TETRAFLUOROETHANE	R-134a	3159	CH ₂ -F-CF ₃
xvii)	TRICHLOROTRIFLUOROETHANE	R-113a	1983	C ₂ H ₂ ClF ₃
xviii)	CHLOROTRIFLUOROETHANE	R-133a	1983	CH ₂ ClCF ₃
xix)	FLUOROETHANE	R-161	2453	C ₂ H ₅ F
xx)	CHLORODIFLUOROMETHANE	R-22	1018	CHClF ₂
xxi)	1, 1, 1, 3, 3, 3-HEXAFLUOROPROPANE	R-236fa	3163	C ₃ H ₂ F ₆
xxii)	1, 1, 1, 3, 3-PENTAFLUOROPROPANE	R-245fa	3163	C ₃ H ₃ F ₅
xxiii)	1, 2-DICHLORO-1, 1, 2-RIFLUOROETHANE	R-123a	—	CHClFCClF ₂
xiv)	OCTAFLUOROPROPANE	R-218	2424	C ₃ F ₈
xxv)	2, 2-DICHLORO-1, 1, 1-RIFLUOROETHANE	R-123	—	C ₂ HF ₃ Cl ₂
xxvi)	1, 1, 1, 2, 3, 3, 3-HEPTAFLUOROPROPANE	R-227a	3296	C ₃ HF ₇
xxvii)	ISOPENTANE	R-601a	1265	CH(CH ₃) ₂ CH ₃
xxviii)	METHYLFORMATE	R-611	—	C ₂ H ₄ O ₂
xxix)	DICHLOROMETHANE	R-30	—	CH ₂ Cl ₂
xxx)	1, 1-DICHLORO-1-FLUOROETHANE	R-141b	—	C ₂ H ₃ FCl ₂

Table 3 Name of Low Pressure Refrigerant Gases (Flammable) With Chemical Formulae and UN Number

[Clauses 3.1.2, 5.1 (b)]

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
i)	1-CHLORO-1,1-DIFLUOROETHANE	R-142B	2517	CH_3CClF_2
ii)	DIFLUOROMETHANE (METHYLENE FLUORIDE)	R-32	3252	CH_2F_2
iii)	DIFLUOROETHANE (ETHYLENE FLUORIDE)	R-152a	1978	CH_3CHF_2
iv)	ETHYL CHLORIDE	R-160	1037	$\text{C}_2\text{H}_5\text{Cl}$
v)	1,1 DIFLUOROETHANE	R-152A	1030	$\text{C}_2\text{H}_4\text{F}_2$
vi)	n – BUTANE	R-600a	1011	C_4H_{10}
vii)	2,3,3,3-TETRAFLUORO-1-PROPANE	R-1234YF	3161	$\text{C}_3\text{H}_2\text{F}_4$ ($\text{CF}_3\text{CF}=\text{CH}_2$)
viii)	TRANS-1,3,3,3-TETRAFLUORO-1-PROPANE	R-1243za (E)	–	$\text{CF}_3\text{CH}=\text{CHF}$
ix)	TRANS-1,3,3,3-TETRAFLUORO-PROP-1-ENE	R-1234ze	3163	$\text{CF}_3\text{CH}=\text{CHF}$
x)	PROPYLENE	R-1270	–	C_3H_6
xi)	CHLOROMETHANE METHYL CHLORIDE	R-40	1063	CH_3Cl
xii)	DIETHYLETHER	R-610	–	$\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$

Table 4 Name of High Pressure Refrigerant Gases (Non Flammable) with Chemical Formulae and UN Number

(Clause 3.1.2)

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
i)	TETRAFLUOROETHYLENE	R-1114	1081	C_2F_4
ii)	1,1-DIFLUOROETHYLENE	R-1132a	1959	$\text{C}_2\text{H}_2\text{F}_2$
iii)	SUVA' REFRIGERANT 2,2-DICHLORO-1,1,1-TRIFLUOROETHANE	R-123	–	CHCl_2CF_3
iv)	BROMOTRIFLUOROMETHANE	R-13B1	1009	CBrF_3
v)	TETRAFLUORMETHANE (CARBON TETRAFLUORIDE)	R-14	1982	CF_4
vi)	TRIFLUOROMETHANE	R-23	1984	CHF_3
vii)	HEXAFLUOROETHANE	R-116	2193	C_2F_6
viii)	VINYL FLUORIDE Inhibited/VINYL FLUORIDE	R-1141	1860	$\text{C}_2\text{H}_3\text{F}$
ix)	PENTAFLUOROETHANE	R-125	3220	C_2HF_5

Table 5 Name of High Pressure Refrigerant Gases (Flammable) with Chemical Formulae and UN Number

(Clause 3.1.2)

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
i)	1,1,1-TRIFLUOROETHANE	R-143a	2035	CH_3CF_3
ii)	TRIFLUORO ETHANE	R-143a	3163	$\text{C}_2\text{H}_3\text{F}_3$
iii)	FLUOROMETHANE	R-41	2454	CH_3F
iv)	1,1-DIFLUOROETHYLENE (VINYL)	R-1132a	1959	$\text{CH}_2=\text{CF}_2$

Table 6 Name of Mixture Refrigerant Gases with Chemical Formulae and UN Number
(Clause 3.1.2)

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
i)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-Tetrafluoroethane R-32/125/134a	R-407D	1078	CH ₂ F ₂ (15±2 percent), C ₂ HF ₅ (15±2 percent), C ₂ H ₂ F ₄ (70±2 percent)
ii)	Octafluoropropane 1, 1, 1, 2-Tetrafluoroethane Isobutane R-218/134a/600a	R-413A	1078	C ₃ F ₈ (9±1 percent), C ₂ H ₂ F ₄ (88±2 percent), C ₄ H ₁₀ (3+0, -1 percent)
iii)	Dichlorodifluoromethane, 1, 1, Difluoroethane R-12/152a	R-500	2602	CCl ₂ F ₂ (73.8 percent), C ₂ H ₄ F ₂ (26.2 percent)
iv)	Trifluoromethane Hexafluoroethane R-23/116	R-508B	1078	CHF ₃ (46 percent), C ₂ F ₆ (54 percent)
v)	Difluoromethane Pentafluoroethane 1, 1, 1, 2 – Tetrafluoroethane R-32/125/134a	R-407C	3163	CH ₂ F ₂ (23±2 percent), C ₂ HF ₅ (25±2 percent), C ₂ H ₂ F ₄ (52±2percent)
vi)	Chlorodifluoromethane Isobutane 1-chloror-1, 1-difluoroethane R-22/600a/142b	R-406A	1956	C ₄ H ₁₀ (4±1 percent), CHClF ₂ (55±2 percent), C ₂ H ₃ F ₂ Cl (41±0 percent)
vii)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-Tetrafluoroethane R-32/125/134a	R-407F	—	CH ₂ F ₂ (30±2 percent), C ₂ HF ₅ (30±2 percent), C ₂ H ₂ F ₄ (40±2 percent)
viii)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-Tetrafluoroethane R-32/125/134a	R-407F	—	CH ₂ F ₂ (30±2 percent), C ₂ HF ₅ (30±2 percent), C ₂ H ₂ F ₄ (40±2 percent)
ix)	Propylene Chlorodifluoromethane 1, 1-difluoroethane R-1270/22/152a	R-411B	—	C ₃ H ₆ (3+0, -1 percent), CHClF ₂ (94+2,-0 percent), C ₂ H ₄ F ₂ (3+0, -1 percent)
x)	Propylene Chlorodifluoromethane 1, 1-difluoroethane R-1270/22/152a	R-411A	—	C ₃ H ₆ (1.5+0, -1 percent), CHClF ₂ (87.5+2, -0 percent), C ₂ H ₄ F ₂ (11+0, -1 percent)
xi)	Chlorodifluoromethane 1, 1-difluoroethane 1-Chloro-1, 1-difluoroethane Octafluorocyclobutane R-22/152a/142b/RC-318	R-405A	—	CHClF ₂ (45±0 percent) C ₂ H ₄ F ₂ (7±1 percent), C ₂ H ₃ F ₂ Cl (5.5±1 percent) C ₄ F ₈ (42.5±2 percent)
xii)	Pentafluoroethane, 1, 1, 1 – Trifluoroethane R-125/143a	R-507A	—	C ₂ HF ₅ (50 percent), C ₂ H ₃ F ₃ (50 percent)
xiii)	Trifluoromethane, Hexafluoroethane	R-507B	1078	CHF ₃ , C ₂ F ₆
xiv)	Chlorodifluoromethane 1, 1-Difluoroethane 1-Chloro-1, 1-Difluoroethane Octafluorocyclobutane R-22/152a/142b/RC-318	R-405A	—	CHClF ₂ (45±0 percent) C ₂ H ₄ F ₂ (7±1 percent) C ₂ H ₃ F ₂ Cl (5.5±1 percent) C ₄ F ₈ (42.5±1 percent)
xv)	Chlorodifluoromethane Octafluoropropane 1-chloro-1, 1-difluoroethane R22/R218/R142b	R-412A	—	CHClF ₂ (70±2 percent) C ₃ F ₈ (5±2 percent) C ₂ H ₃ F ₂ Cl (25±1 percent)
xvi)	Difluoromethane Pentafluoroethane R32/R125	R-410B	—	CH ₂ F ₂ (45±1 percent) C ₂ HF ₅ (55±1 percent)
xvii)	Chlorodifluoromethane 1, 1-difluoroethane 2-chloro-1, 1, 1, 2-tetrafluoroethane R22/R152a/R124	R-401C	—	CHClF ₂ (33±2 percent) C ₂ H ₄ F ₂ (15±5,-1.5 percent) C ₂ HF ₄ Cl (52±1 percent)
xviii)	R-23/13 R-503 Pentafluoroethane, Trifluoromethane	R-503	2599	CHF ₃ (40.1 percent) CClF ₃ (59.9 percent)
xix)	Trifluoroethane Hexafluoroethane R-23/116	R-508A	1078	CHF ₃ (39 percent) C ₂ F ₆ (61 percent)
xx)	R-509A R-22/218 Chlorodifluoromethane, Octafluoropropane	R-509A	1078	CHClF ₂ (44 percent) C ₃ F ₈ (56 percent)

Table 6 (Continued)

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
xxi)	Chlorodifluoromethane 2-Chloro-1, 1, 1, 2-Tetrafluoroethane Isobutane 1-Chloro-1, 1-Difluoroethane R-22/124/600a/142b	R-414A	3163	CHClF ₂ (51±2 percent) C ₂ H ₂ F ₄ Cl (28.5±2 percent) C ₄ H ₁₀ (4±5 percent) C ₂ H ₃ F ₂ Cl (16.5+5, -1 percent)
xxii)	1, 1, 1, 2-Tetrafluoroethane 2-Chloro-1, 1, 2 – Tetrafluoroethane Butane R-134a/124/600	R-416A	1078	C ₂ H ₂ F ₄ (59+5, -1 percent) C ₂ H ₂ F ₄ Cl (39.5+1, -5 percent) C ₄ H ₁₀ (1.5+1, -2 percent)
xxiii)	Chlorodifluoromethane 1, 1-difluoroethane 2-chloro-1, 1, 2, 2-tetrafluoroethane R-22/152a/124	R-401A	3163	CHClF ₂ (53±2 percent) C ₂ H ₄ F ₂ (13+5, -1.5 percent) C ₂ H ₂ F ₄ Cl (34±1 percent)
xxiv)	Chlorodifluoromethane 1, 1-difluoroethane 2-chloro-1, 1, 2, 2-tetrafluoroethane R-22/152a/124	R-401B	3163	CHClF ₂ (61±2 percent) C ₂ H ₄ F ₂ (11+5, -1.5 percent) C ₂ H ₂ F ₄ Cl (28±1 percent)
xxv)	Pentafluoroethane Propane Chlorodifluoromethane R-125/290/22	R-402A	3163	C ₂ H ₂ F ₅ (60±2 percent) C ₃ H ₈ (2±1 percent) CHClF ₂ (38±2 percent)
xxvi)	Pentafluoroethane (125) Propane Chlorodifluoroethane (22) R-125/290/22	R-402B	3163	C ₂ H ₂ F ₅ (38±2 percent) C ₃ H ₈ (2±1 percent) CHClF ₂ (60±2 percent)
xxvii)	Propane Chlorodifluoromethane Octafluoropropane R-290/22/218	R-403A	–	C ₃ H ₈ (5±2.2 percent) CHClF ₂ (75±2 percent) C ₃ H ₈ (20±0 percent)
xxviii)	Pentafluoroethane 1, 1, 1-trifluoroethane 1, 1, 2-tetrafluoroethane R-125/143a/134a	R-404A	3337	C ₂ H ₂ F ₅ (44±2 percent) C ₂ H ₃ F ₃ (52±1 percent) C ₂ H ₂ F ₄ (4±2 percent)
xxix)	Chlorodifluoromethane Isobutane 1-chloro-1, 1-difluoroethane R-22/600a/142b	R-406A	1078	CHClF ₂ (55±2 percent) C ₄ H ₁₀ (4±1 percent) C ₂ H ₃ F ₂ Cl (4±0 percent)
xxx)	Difluoroethane Petrofluoroethane 1, 1, 1, 2-Tetrafluoroethane R-32/125/134a	R-407A	3338	CH ₂ F ₂ (2±2 percent) C ₂ H ₂ F ₅ (40±2 percent) C ₂ H ₂ F ₄ (40±2 percent)
xxxi)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane R-32/125/134a	R-407B	3339	CH ₂ F ₂ (10±2 percent) C ₂ H ₂ F ₅ (70±2 percent) C ₂ H ₂ F ₄ (20±2 percent)
xxxii)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane R-32/125/134a	R-407C	3340	CH ₂ F ₂ (23±2 percent) C ₂ H ₂ F ₅ (25±2 percent) C ₂ H ₂ F ₄ (52±2 percent)
	Difluoromethane Pentafluoroethane 1, 1, 2-tetrafluoroethane Tetrafluoroethane R-32/125/134a	R-407F	–	CH ₂ F ₂ (30±2 percent) C ₂ H ₂ F ₅ (30±2 percent) C ₂ H ₂ F ₄ (40±2 percent)
xxxiii)	Pentafluoroethane Trifluoroethane Chlorodifluoroethane R-125/143a/22	R-408A	–	C ₂ H ₂ F ₅ (7±2 percent) C ₂ H ₃ F ₃ (46±1 percent) CHClF ₂ (47±2 percent)
xxxiv)	Chlorodifluoromethane Chlorodifluoroethane 1-chloro-1, 1-difluoroethane R-22/142/142b	R-409A	3163	CHClF ₂ (60±2 percent) C ₂ H ₂ F ₄ Cl (25±2 percent) C ₂ H ₃ F ₂ Cl (15±1 percent)
xxxv)	Chlorodifluoromethane 2-chloro-1, 1, 1, 2-tetrafluoroethane 1-chloro-1, 1-difluoroethane R-22/124/142b	R-409B	–	CHClF ₂ (65±2 percent) C ₂ H ₂ F ₄ Cl (25±2 percent) C ₂ H ₃ F ₂ Cl (10±percent)
xxxvi)	Difluoromethane Pentafluoroethane R-32/125	R-410B	–	CH ₂ F ₂ (45±1 percent) C ₂ H ₂ F ₅ (55±1 percent)
xxxvii)	1, 1, 1, 2-tetrafluoroethane 2-chloro-1, 1, 1, 2-tetrafluoroethane Butane R-134a/124/600	R-416A	1078	C ₂ H ₂ F ₄ (59+5, -1 percent) C ₂ H ₂ F ₄ Cl (39.5+1, -5 percent) C ₄ H ₁₀ (1.5+1, -2 percent)

Table 6 (Continued)

Sl No. (1)	Name of Refrigerant Gas (2)	Refrigerant No. (3)	UN No. (4)	Chemical Symbol (5)
xxxviii)	1, 1, 1, 2-tetrafluoroethane 1,1-difluoroethane R-134a/152a	R-512A	—	C ₂ H ₂ F ₄ (5 percent) C ₂ H ₄ F ₂ (95 percent)
xxxix)	Propane Dimethylether R-290/E170/	R-511A	—	C ₃ H ₈ (95 ± 1 percent) C ₂ H ₆ O (5 ± 1 percent)
xl)	Dimethylether Isobutane R-E170/600a/	R-510A	—	C ₂ H ₆ O (88 ± 5 percent) C ₄ H ₁₀ (12 ± 5 percent)
xli)	Chlorodifluoromethane Octafluoropropane R-22/218	R-509A	1078	CHClF ₂ (44 percent) C ₃ F ₈ (56 percent)
xl ii)	Chlorodifluoromethane Chloropentafluoroethane R-22/115	R-502	1973	CHClF ₂ (48.8 percent) C ₂ F ₅ Cl (51.2 percent)
xl iii)	Chlorodifluoromethane Dichlorodifluoromethane R-22/12	R-501	—	CHClF ₂ (75 percent) CCl ₂ F ₂ (25 percent)
xl iv)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane 1, 1-difluoroethane Heptafluoropropane R-32/125/134a/152a/227ea	R-442A	3163	CH ₂ F ₂ (31 percent) C ₂ HF ₅ (31 percent) C ₂ H ₂ F ₄ (30 percent) C ₂ H ₄ F ₂ (3 percent) C ₂ HF ₇ (5 percent)
xl v)	Ethane Propane Isobutane Butane R-170/290/600a/600	R-441A	—	C ₂ H ₆ (3.1 ± 3 percent) C ₃ H ₈ (54.8 ± 2 percent) C ₄ H ₁₀ (42.1 ± 2.6 percent)
xl vi)	Propane 1, 1, 1, 2-tetrafluoroethane 1, 1-difluoroethane R-290/134a/152a	R-440A	—	C ₃ H ₈ (6 ± 1 percent) C ₂ H ₂ F ₄ (1.6 ± 6 percent) C ₂ H ₄ F ₂ (97.8 ± 5 percent)
xl vii)	Difluoromethane Pentafluoroethane Isobutane R-32/125/600a	R-439A	—	CH ₂ F ₂ (50 ± 1 percent) C ₂ HF ₅ (47 ± 1 percent) C ₄ H ₁₀ (3 ± 5 percent)
xl viii)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane Butane Isopentane R-32/125/134a/600/601a	R-438A	1078	CH ₂ F ₂ (8.5 ± 5, – 1.5 percent) C ₂ HF ₅ (45 ± 1.5 percent) C ₂ H ₂ F ₄ (44.2 ± 1.5 percent) C ₄ H ₁₀ (1.7 + 1 – 2 percent) C ₅ H ₁₂ (6 + 1, – 2 percent)
xl ix)	Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane Butane Pentane R-125/134a/600/601	R-437A	3163	C ₂ HF ₅ (19.5 + 5, – 1.8 percent) C ₂ H ₂ F ₄ (78.5 + 1.5, – 7 percent) C ₄ H ₁₀ (1.4 + 1, – 2 percent) C ₅ H ₁₂ (6 + 1, – 2 percent)
l)	Propane Isobutane R-290/600a	R-436B	—	C ₃ H ₈ (52 ± 1 percent) C ₄ H ₁₀ (48 + 1 percent)
li)	Propane Isobutane R-290/600a	R-436A	—	C ₃ H ₈ (56 ± 1 percent) C ₄ H ₁₀ (44 ± 1 percent)
lii)	Difluoromethane Chloropentafluoroethane R-32/115	R-504	—	CH ₂ F ₂ (48.2 percent) C ₂ F ₅ Cl (51.8 percent)
liii)	Dichlorodifluoromethane Chlorofluoromethane R-12/31	R-505	—	CCl ₂ F ₂ (78 percent) CH ₂ FCI (22 percent)
liv)	Chlorofluoromethane 1,2-dichlorotetrafluoroethane R-31/114	R-506	—	CH ₂ FCI (55.1 percent) C ₂ F ₄ Cl ₂ (44.9 percent)
lv)	Dimethylether 1, 1, 2-difluoroethane R-E170/152a	R-435A	—	C ₂ H ₆ O (80 ± 1 percent) C ₂ H ₄ F ₂ (20 ± 1 percent)
lvi)	Pentafluoroethane 1, 1, 1, 2-trifluoroethane 1,1,1,2-tetrafluoroethane Isobutane R-125/143a/134a/600a	R-434A	3163	C ₂ HF ₅ (63.2 ± 1 percent) C ₂ H ₃ F ₃ (18 ± 1 percent) C ₂ H ₂ F ₄ (16 ± 1 percent) C ₄ H ₁₀ (2.8 + 1, – 2 percent)
lvii)	Propylene Propane R-1270/290	R-433C	—	C ₃ H ₆ (25 ± 1 percent) C ₃ H ₈ (75 ± 1 percent)
lviii)	Propylene Propane R-1270/290	R-433B	—	C ₃ H ₆ (5 ± 1 percent) C ₃ H ₈ (95 ± 1 percent)

Table 6 (Continued)

SI No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
lix)	Propylene Propane R-1270/290	R-433A	—	C_3H_6 (30 ± 1 percent) C_3H_8 (70 ± 1 percent)
lx)	Propylene Dimethylether R-1270/E-170	R-432A	—	C_3H_6 (80 ± 1 percent) C_2H_6O (20 ± 1 percent)
lxi)	Propane 1,1-difluoroethane R-290/152a	R-431A	—	C_3H_8 (71 ± 1 percent) $C_2H_4F_2$ (29 ± 1 percent)
lxii)	1,2-difluoroethane Isobutane R-152a/600a	R-430A	—	$C_2H_4F_2$ (76 ± 1 percent) C_4H_{10} (24 ± 1 percent)
lxiii)	Dimethylether 1,1-difluoroethane Isobutane R-E170/152a/600a	R-429A	—	C_2H_6O (60 ± 1 percent) $C_2H_4F_2$ (10 ± 1 percent) C_4H_{10} (30 ± 1 percent)
lxiv)	Pentafluoroethane 1,1,1-trifluoroethane Propane Isobutane R-125/143a/290/600a	R-428A	3163	C_2HF_5 (77.5 ± 1 percent) $C_2H_2F_3$ (20 ± 1 percent) C_3H_8 (6 + 1, -2 percent) C_4H_{10} (19 + 1, -2 percent)
lxv)	Difluoromethane Pentafluoroethane 1,1,1-trifluoroethane 1,1,1,2-tetrafluoroethane R-32/125/143a/134a	R-427A	3163	CH_2F_2 (15 ± 2 percent) C_2HF_5 (25 ± 2 percent) $C_2H_3F_3$ (10 ± 2 percent) $C_2H_2F_4$ (50 ± 2 percent)
lxvi)	Pentafluoroethane 1,1,1,2-tetrafluoroethane Butane Isopentane R-125/134a/600/601a	R-426A	3163	C_2HF_5 (5.1 ± 1 percent) $C_2H_2F_4$ (93 ± 1 percent) C_4H_{10} (1.3 + 1, -2 percent) C_5H_{12} (6 + 1, -2 percent)
lxvii)	Difluoromethane 1,1,1,2-tetrafluoroethane 1,1,1,2,3,3,3-heptafluoropropane R-32/134a/227ea	R-425A	—	CH_2F_2 (18.5 ± 5 percent) $C_2H_2F_4$ (69.5 ± 5 percent) C_3HF_7 (12 ± 5 percent)
lxviii)	Pentafluoroethane 1,1,1,2-tetrafluoroethane Isobutane Butane R-125/134a/600a/600	R-424A	3163	C_2HF_5 (50.5 ± 1 percent) $C_2H_2F_4$ (47 ± 1 percent) C_4H_{10} (1.9 + 3, -1 percent) C_5H_{12} (6 + 1, -2 percent)
lxix)	1,1,1,2-tetrafluoroethane 1,1,2,2,3,3,3-heptafluoropropane R-134a/227ea	R-423A	—	$C_2H_2F_4$ (52.5 ± 1 percent) C_3HF_7 (47.5 ± 1 percent)
lxx)	Pentafluoroethane 1,1,1,2-Tetrafluoroethane Isobutane R-125/134a/600a	R-422D	3163	C_2HF_5 (65.1 + 9, -1.1 percent) $C_2H_2F_4$ (31.5 ± 1 percent) C_4H_{10} (3.4 + 1, -4)
lxxi)	Pentafluoroethane 1,1,1,2-tetrafluoroethane Isobutane R-125/134a/600a	R-422C	—	C_2HF_5 (82 ± 1 percent) $C_2H_2F_4$ (15 ± 1 percent) C_4H_{10} (3 + 1, -5 percent)
lxxii)	1,1,1,2-2 Pentafluoroethane 1,1,1,2 Tetrafluoroethane Isobutane R-125/134a/600a	R-422B	—	C_2HF_5 (55 ± 1 percent) $C_2H_2F_4$ (42 ± 1 percent) C_4H_{10} (3 + 1, -5 percent)
lxxiii)	Pentafluoroethane 1,1,1,2-Tetrafluoroethane Isobutane R-125/134a/600a	R-422A	—	C_2HF_5 (85.1 ± 1 percent) $C_2H_2F_4$ (11.5 ± 1 percent) C_4H_{10} (3.4 + 1, -4 percent)
lxxiv)	Pentafluoroethane 1,1,1,2-tetrafluoroethane R-125/134a	R-421B	—	C_2HF_5 (85 ± 1 percent) $C_2H_2F_4$ (15 ± 1 percent)
lxxv)	Pentafluoroethane 1,1,1,2-tetrafluoroethane R-125/134a	R-421A	1078	C_2HF_5 (58 ± 1 percent) $C_2H_2F_4$ (42 ± 1 percent)
lxxvi)	1,1,1,2-tetrafluoroethane 1-fluoro-1, 1-difluoroethane R-134a/142b	R-420A	—	$C_2H_2F_4$ (88 + 1, -0 percent) $C_2H_3F_2Cl$ (12 + 0, -1 percent)
lxxvii)	Pentafluoroethane 1,1,1,2-tetrafluoroethane Dimethylether R-125/134a/E170	R-419A	—	C_2HF_5 (77 ± 1 percent) $C_2H_2F_4$ (19 ± 1 percent) C_2H_6O (4 ± 1 percent)

Table 6 (Concluded)

Sl No.	Name of Refrigerant Gas	Refrigerant No.	UN No.	Chemical Symbol
(1)	(2)	(3)	(4)	(5)
lxxviii)	Propane Chlorodifluoromethane 1, 1-difluoroethane R-290/22/152a	R-418A	—	C ₃ H ₈ (1.5 ± 5 percent) CHClF ₂ (96 ± 1 percent) C ₂ H ₄ F ₂ (2.5 ± 5 percent)
lxxix)	Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane Butane R-125/134a/600	R-417B	—	C ₂ HF ₅ (79 ± 1 percent) C ₂ H ₂ F ₄ (18.3 ± 1 percent) C ₄ H ₁₀ (2.7 + 1, -5 percent)
lxxx)	Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane Butane R-125/134a/600	R-417A	1078	C ₂ HF ₅ (46.6 ± 1 percent) C ₂ H ₂ F ₄ (50 ± 1 percent) C ₄ H ₁₀ (3.4 + 1, -4 percent)
lxxxi)	Chlorodifluoromethane 1, 1-difluoroethane R-22/152a	R-415B	—	CHClF ₂ (25 ± 1 percent) C ₂ H ₄ F ₂ (75 ± 1 percent)
lxxxii)	Chlorodifluoromethane 1, 1-difluoroethane R-22/152a/	R-415A	—	CHClF ₂ (82 ± 1 percent) C ₂ H ₄ F ₂ (18 ± 1 percent)
lxxxiii)	Chlorodifluoromethane 2-Chloro-1, 1, 1, 2-Tetrafluoroethane Isobutane R-22/124/600a/142b 1-Chloro-1, 1-difluoroethane	R-414B	3163	CHClF ₂ (50 ± 2 percent) C ₂ HF ₄ Cl (39 ± 2 percent) C ₄ H ₁₀ (1.5 ± 5 percent) C ₂ H ₃ F ₂ Cl (9.5 + 5, -1 percent)
lxxxiv)	Chlorodifluoromethane 2-chloro-1, 1, 1, 2-tetrafluoroethane Isobutane 1-chloro-1, 1-difluoroethane R-22/124/600a/142b	R-414	—	CHClF ₂ (51 ± 2 percent) C ₂ HF ₄ Cl (28.5 ± 2 percent) C ₄ H ₁₀ (4 ± 5 percent) C ₂ H ₃ F ₂ Cl (16.5 + 5, -1 percent)
lxxxv)	Octafluoropropane 1, 1, 1, 2-tetrafluoroethane Isobutane R-218/134a/600a	R-413A	1078	C ₃ F ₈ (9 ± 1 percent) C ₂ H ₂ F ₄ (88 ± 2 percent) C ₄ H ₁₀ (3 + 0, -1 percent)
lxxxvi)	Chlorodifluoromethane Octafluoropropane 1-chloro-1, 1-difluoroethane R-22/218/142b	R-412A	—	CHClF ₂ (70 ± 2 percent) C ₃ F ₈ (5 ± 2 percent) C ₂ H ₃ F ₂ Cl (25 ± 1 percent)
lxxxvii)	Difluoromethane Pentafluoroethane R-32/125	R-410A	3163	CH ₂ F ₂ (50 + 5, -1.5 percent) C ₂ HF ₅ (50 + 1.5, -5 percent)
lxxxviii)	Difluoromethane Pentafluoroethane 1, 1, 1, 2-tetrafluoroethane R-32/125/134a	R-407E	—	CH ₂ F ₂ (25 ± 2 percent) C ₂ HF ₅ (15 ± 2 percent) C ₂ H ₂ F ₄ (60 ± 2 percent)
lxxxix)	Difluoromethane Chloropentafluoroethane R-32/115	R-504	—	CH ₂ F ₂ (48.2 percent) C ₂ F ₃ Cl (51.8 percent)
xc)	Dichlorodifluoromethane Chlorofluoromethane R-12/31	R-505	—	CCl ₂ F ₂ (78 percent) CH ₂ FCI (22 percent)
xc)	Chlorofluoromethane 1,2-dichlorotetrafluoroethane R-31/114	R-506	—	CH ₂ FCI (55.1 percent) C ₂ F ₄ Cl ₂ (44.9 percent)
xcii)	Trifluoroethane Chlorotrifluoromethane R-23/13	R-503	—	CHF ₃ (40.1 percent) CClF ₃ (59.9 percent)

NOTE — Certain Refrigerant gas mixtures have not been allotted UN Numbers.

Table 7 Cylinder Colours Identification (Other Than Refrigerant Gases)

(Clauses 4.1 and 4.5)

Sl No.	Name of Gas	Ground Colour	Colour Shade No./RAL No.	Colour of Shoulder	Colour Shade No./RAL No.	Colour of Band	RAL No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Acetylene	Maroon (541)	RAL 3009	Ground colour	RAL 3009	—	—
ii)	Air	French grey (630)	C. S. 630	Ground colour	C. S. 630	—	—
iii)	Ammonia	Graphite Black	RAL 9011	Signal red (537)	RAL 3001	Golden yellow (356)	RAL 1004
iv)	Argon	Peacock blue (103)	C. S. 103	Ground colour	C. S. 103	—	—
v)	Butane	Signal red (537)	RAL 3001	Signal red (537)	RAL 3001	—	—
vi)	Carbon dioxide	Graphite Black	RAL 9011	White or Aluminium paint	RAL 9006	Graphite Black	RAL 9011
vii)	Carbon monoxide	Signal red (537)	RAL 3001	Golden yellow (356)	RAL 1004	Signal red (537)	RAL 3001
viii)	Chlorine	Golden yellow (356)	RAL 1004	Ground colour	RAL 1004	—	—
ix)	CNG	White	RAL 9003	White	RAL 9003	—	—
x)	Coal gas	Signal red (537)	RAL 3001	Ground colour	RAL 3001	—	—
xi)	Ethyl chloride	French grey (630)	C.S. 630	Signal red (537)	RAL 3001	—	—
xii)	Ethylene	Dark violet (796)	RAL 4011	Signal red (537)	RAL 3001	Signal Yellow	RAL 1003
xiii)	Ethylene oxide	Dark violet (796)	RAL 4011	Signal red (537)	RAL 3001	Golden yellow (356)	RAL 1004
xiv)	Helium	Middle brown (411)	C. S. 411	Ground colour	C. S. 411	—	—
xv)	Hydrogen cyanide	Peacock blue (103)	C. S. 103	Ground colour	C. S. 103	Golden yellow (356)	RAL 1004
xvi)	Hydrogen	Signal red (537)	RAL 3001	Ground colour	RAL 3001	—	—
xvii)	Liquefied petroleum gas (LPG)	Signal red (537)	RAL 3001	Ground colour	RAL 3001	—	—
xviii)	Methane	White	RAL 9003	Signal Red (537)	RAL 3001	—	—
xix)	Methyl bromide	Peacock blue (103)	C.S. 103	Graphite Black	RAL 9011	Grass Green	RAL 6010
xx)	Methyl chloride	Light Brunswick green (225)	C.S. 225	Signal red (537)	RAL 3001	Signal Yellow	RAL 1003
xxi)	Neon	Middle brown (411)	C.S. 411	Graphite Black	RAL 9011	Signal Blue	RAL 5005
xxii)	Nitrogen	French grey (630)	C.S. 630	Graphite Black	RAL 9011	Bottle Green	RAL 6007
xxiii)	Oxygen	Graphite Black	RAL 9011	Ground colour	RAL 9011	—	—
xxiv)	Phosgene	Graphite Black	RAL 9011	Peacock blue (103)	RAL 1004	Golden yellow (356)	RAL 1004
xxv)	Propane	Signal red (537)	RAL 3001	Ground colour	RAL 3001	—	—
xxvi)	Sulphur dioxide	Light Brunswick green (225)	C.S. 225	Golden yellow (356)	RAL 1004	Signal Black	RAL 9004

NOTES

1 Colour shades have been taken from either of the two Standards – **I)** CS (Colour Shade) Designated from IS 5 and **II)** RAL: from RAL colour Standard.

2 For Aluminium cylinders – Refer to clause 4.

**Table 8 Cylinder Colours Identification of Refrigerant Gases
(Low Pressure–Non Flammable)**

(Clause 4.2)

Sl No.	Name of Gas	Ground Colour	Colour Shade No./RAL No.	Colour of Shoulder	Colour Shade No./RAL No.	Colour of Band	RAL No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	TRICHLOROMONOFUOROMETHANE R-11	FRENCH GREY (630)	C S 630	DARK VIOLET (796)	RAL 4011	–	–
ii)	OCTAFLUOROPROPANE R-218						
iii)	VINYL FLUORIDE R-141						
iv)	DIBROMOTETRAFLUORO - ETHANE R-114B2						
v)	DICHLORODIFLUOROMETHANE R-12						
vi)	BROMOCHLORODIFLUORO METHANE R-12B1						
vii)	CHLOROTRIFLUOROMETHANE R-13						
viii)	DICHLOROFLUOROMETHANE R-21						
ix)	TRICHLOROTRIFLUOROETHANE R-113						
x)	DICHLOROTETRA-FLUOROETHANE R-114						
xi)	CHLOROPENTAFLUOROETHANE R-115						
xii)	CHLOROTETRAFLUOROETHANE R-124						
xiii)	OCTAFLUOROCYCLOBUTANE R-C318						
xiv)	HEXAFLUOROPROPENE R-1216						
xv)	ETHYL METHYL ETHER R-227						
xvi)	R-134A 1, 1, 1, 2-TETRAFLUOROETHANE - R-134a						
xvii)	TRICHLOROTRIFLUOROETHANE R-113a						
xviii)	CHLOROTRIFLUOROETHANE R-133a						
xix)	FLUOROETHANE - R-161						
xx)	CHLORODIFLUOROMETHANE R-22						
xxi)	1, 1, 1, 3, 3-HEXAFLUOROPROPANE R-236fa						
xxii)	1, 1, 1, 3, 3 – PENTAFLUOROPROPANE R-245fa						
xxiii)	1, 1, 1, 2, 3, 3, 3-HEPTAFLUOROPROPANE R-227ea						
xxiv)	1, 2-DICHLORO-1,1,2-TRIFLUOROETHANE R-123a						
xxv)	OCTAFLUOROPROPANE R-218						
xxvi)	2,2-DICHLORO-1,1,1-TRIFLUOROETHANE R-123						
xxvii)	1, 1, 1, 2, 3, 3, 3-HEPTAFLUOROPROPANE R-227a						
xxviii)	ISOPENTANE R-601a						
xxix)	METHYLFORMATE R-611						
xxx)	DICHLOROMETHANE R-30						
xxxi)	1, 1-DICHLORO-1-FLUOROETHANE R-141b						

Table 9 Cylinder Colours Identification of Refrigerant Gases (High Pressure – Non Flammable)*(Clause 4.2)*

Sl No.	Name of Gas	Ground Colour	Colour Shade No./Ral No.	Colour of Shoulder	Colour Shade No./Ral No.	Colour of Band	Ral No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	1-CHLORO-1, 1-DIFLUOROETHANE R-142B	FRENCH GREY (630)	C S 630	DARK VIOLET (796)	RAL 4011	SIGNAL RED (537)	RAL 3001
ii)	DIFLUOROMETHANE (METHYLENE FLUORIDE) R-32						
iii)	DIFLUOROETHANE (ETHYLENE FLUORIDE) R-152a						
iv)	ETHYL CHLORIDE R-160						
v)	1, 1 DIFLUOROETHANE R-152A						
vi)	n - BUTANE R-600a						
vii)	2, 3, 3, 3-TETRAFLUORO-1- PROPANE R-1234YF						
viii)	TRANS-1,3,3,3- TETRAFLUORO-1-PROPANE R-1243za(E)						
ix)	TRANS-1,3,3,3- TETRAFLUORO-PROP-1-ENE R-1234ze						
x)	PROPYLENE R-1270						
xi)	CHLOROMETHANE METHYLCHLORIDE R-40						
xii)	DIETHYLETHER R-610						

Table 10 Cylinder Colours Identification of Refrigerant Gases (Low Pressure – Flammable)

(Clause 4.2)

Sl No.	Name of Gas	Ground Colour	Colour Shade No./RAL No.	Colour of Shoulder	Colour Shade No./RAL No.	Colour of Band	RAL No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	TETRAFLUOROETHYLENE R-1114	FRENCH GREY (630)	C S 630	GROUND COLOUR	C S 630	–	–
ii)	1, 1-DIFLUOROETHYLENE R-1132a						
iii)	SUVA' REFRIGERANT 2,2 - DICHLORO-1,1, 1-TRIFLUOROETHANE R-123						
iv)	BROMOTRIFLUOROMETHANE R-13B1						
v)	TETRAFLUORMETHANE (CARBON TETRAFLUORIDE) R-14						
vi)	TRIFLUOROMETHANE R-23						
vii)	HEXAFLUOROETHANE R-116						
viii)	VINYL FLUORIDE Inhibited/VINYL FLUORIDE R-1141						
ix)	PENTAFLUOROETHANE R-125						

**Table 11 Cylinder Colours Identification of Refrigerant Gases
(High Pressure–Flammable)**

(Clause 4.2)

Sl No.	Name of Gas	Ground Colour	Colour Shade No./Ral No.	Colour of Shoulder	Colour Shade No./Ral No.	Colour of Band	Ral No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	1, 1, 1 – TRIFLUOROETHANE R-143a	FRENCH GREY (630)	C S 630	GROUND COLOUR	C S 630	SIGNAL RED (537)	RAL 3001
ii)	TRIFLUORO ETHANE R-143a						
iii)	FLUOROMETHANE R-41						
iv)	1,1-DIFLUOROETHYLENE (VINYL) R-1132a						

Table 12 Colour Identification of Specific Gas Mixtures
(Clause 4.4)

Sl No.	Gas Mixture (with More than 50 percent of the First Named Gas)	Ground Colour	Colour Shade No./RAL No.	Colour of Shoulder	Colour Shade No./RAL No.	Colour of Band	Colour Shade No./RAL No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Argon and Carbon dioxide	Peacock Blue (103)	C.S. 103	Ground colour	C.S. 103	Light Brunswick Green (225)	C.S. 225
ii)	Hydrogen and Nitrogen	Red (537)	RAL 3001	Ground colour	RAL3001	Grey (530)	C.S. 530
iii)	Nitrogen and Oxygen	French Grey (630)	C.S. 630	Graphite Black	RAL 9011	Graphite Black	RAL 9011
iv)	Nitrogen and Carbon dioxide	French Grey (630)	C.S. 630	Graphite Black	RAL 9011	Light Brunswick Green (225)	C.S. 225
v)	Air and Carbon dioxide	French Grey (630)	C.S. 630	Ground colour	C.S. 630	Light Brunswick Green (225)	C.S. 225
vi)	Argon and Oxygen	Peacock Blue (103)	C.S. 103	Ground colour	C.S. 103	Graphite Black	RAL 9011
vii)	Argon and Nitrogen	Peacock Blue (103)	C.S. 103	Peacock Blue (103)	C.S. 103	French Grey (630)	C.S. 630

NOTES

1 Colour shades have been taken from either of the two Standards – **I**) CS (Colour Shade) designated from IS 5 and **II**) RAL: from RAL colour Standard.

2 Body colour band shall be painted round the cylinder midway between the base and neck and shall have a width equal to one-fifth of the total length of the cylinder.

3 For Aluminium cylinders – see 5.

Table 13 Colour Identification of Gases and Gas Mixtures

(Clause 4.5)

Sl No.	Nature of Gas or Mixture	Ground Colour of Cylinder Shell (See Notes below)	Colour Shade No./RAL No.	Colour of Shoulder	Colour Shade No./RAL No.	Colour of Band	Colour Shade No./RAL No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Non-Inflammable and non-poisonous	White	RAL 9003	Signal Grey	RAL 7004	Signal Orange	RAL 2010
ii)	Non-Inflammable and poisonous	White	RAL 9003	Golden yellow	CS 356/RAL 1004	Signal Blue	RAL 5005
iii)	Flammable and non-poisonous	White	RAL 9003	Signal red	CS 537/RAL 3001	Signal Grey	RAL 7004
iv)	Flammable and poisonous	White	RAL 9003	Signal red and Golden yellow	CS 537/RAL 3001	Leaf Green	RAL 6002
v)	Gas mixture (not covered in this standard)	Graphite Black (Major Gas Colour)	RAL 9011	Ground Colour	RAL 9011	Golden Yellow Band with apprx. 1/5 th of the Cylinder Length	CS 356/RAL 1004

NOTES

1 Cylinders intended for gas mixtures shall be marked with the words “Gas Mixture” or “Mixed Gas” and in addition, the cylinders shall be marked with the names (symbols, if necessary) of the components of the mixture by stamping, if the cylinders are intended for the permanent use of the particular gas mixture, or by painting, if the cylinders are intended for the casual use of the particular gas mixture.

2 No person shall in any way interfere with or change the colour painted on a gas cylinder: Provided that nothing in this sub-rule shall be deemed to prohibit the re-painting of a cylinder with the identification colour painted on it when it is required for the maintenance of the cylinder or when a cylinder is converted from one gas service to another gas service in accordance with these Standards.

3 Colour shades have been taken from either of the two Standards – I) CS (Colour Shade) designated from IS 5 and II) RAL: from RAL colour Standard.

4 Only colours having reflectance of munsell value not less than 6 should be used.

5 Paints which contain aluminium that constitutes a fire risk should not be used.

6 For Aluminium cylinders – See 5.

7 See Annex A for RAL color code and corresponding shade.

ANNEX A

(Clause Table 13)

RAL COLOR CODE AND CORRESPONDING SHADE

							
1000 Green Beige	1001 Pale Beige	1002 Sand Yellow	1003 Signal Yellow	1004 Dark Golden Yellow	1005 Honey Yellow	1006 Maize Yellow	1007 Chrome Yellow
							
1011 Brown Beige	1012 Lemon Yellow	1013 Pearl White	1014 Dark Ivory	1015 Light Ivory	1016 Sulphur Yellow	1017 Saffron Yellow	1018 Zinc Yellow
							
1019 Grey Beige	1020 Olive Yellow	1021 Cadmium Yellow	1023 Traffic Yellow	1024 Ochre Yellow	1027 Curry Yellow	1028 Melon Yellow	1032 Broom Yellow
							
1033 Dahlia Yellow	1034 Pastel Yellow	2000 Yellow Orange	2001 Red Orange	2002 Vermillion	2003 Pastel Orange	2004 Pure Orange	2008 Light Red Orange
							
2009 Traffic Orange	2010 Signal Orange	2011 Deep Orange	2012 Salmon Orange	3000 Flame Red	3001 RAL Signal Red	3002 Carmine Red	3003 Ruby Red
							
3004 Purple Red	3005 Wine Red	3007 Black Red	3009 Oxide Red	3011 Brown Red	3012 Beige Red	3013 Tomato Red	3014 Antique Pink
							
3015 Light Pink	3016 Coral Red	3017 Rose	3018 Strawberry Red	3020 Traffic Red	3022 Dark Salmon Red	3027 Raspberry Red	3031 Orient Red
							
4001 Red Lilac	4002 Red Violet	4003 Heather Violet	4004 Claret Violet	4005 Blue Lilac	4006 Traffic Purple	4007 Purple Violet	4008 Signal Violet
							
4009 Pastel Violet	4010 Telemagenta	5000 Violet Blue	5001 Green Blue	5002 Ultramarine Blue	5003 dark Sapphire Blue	5004 Black Blue	5005 Signal Blue
							
5007 Brilliant Blue	5008 Grey Blue	5009 Light Azure Blue	5010 Gentian Blue	5011 Steel Blue	5012 Light Blue	5013 Dark Cobalt Blue	5014 Pigeon Blue
							
5015 Middle Sky Blue	5017 Traffic Blue	5018 Turkish Blue	5019 Capri Blue	5020 Ocean Blue	5021 Water Blue	5022 Night Blue	5023 Fern Blue
							
5024 Pastel Blue	6000 Patina Green	6001 Middle Emerald Green	6002 Leaf Green	6003 Middle Olive Green	6004 Blue Green	6005 Light Moss Green	6006 Grey Olive

IS 4379 : 2021

6007 Bottle Green	6008 Brown Green	6009 Fir Green	6010 Middle Grass Green	6011 Reseda Green	6012 Black Green	6013 Reed Green	6014 Yellow Olive
6015 Black Olive	6016 Turquoise Green	6017 May Green	6018 Yellow Green	6019 Pastel Green	6020 Chrome Green	6021 Pale Green	6022 Brown Olive
6024 Traffic Green	6025 Bracken Green	6026 Opal Green	6027 Turkish Green	6028 Pine Tree Green	6029 Mint Green	6032 Signal Green	6033 Turquoise Blue
6034 Pale Turquoise	7000 Dark Squirrel Grey	7001 Silver Grey	7002 Olive Grey	7003 Moss Grey	7004 Signal Grey	7005 Mouse Grey	7006 Beige Grey
7008 Khaki Grey	7009 Green Grey	7010 Tarpaulin Grey	7011 Iron Grey	7012 Basalt Grey	7013 Brown Grey	7015 Slate Grey	7016 Anthracite Grey
7021 Black Grey	7022 Umber Grey	7023 Concrete Grey	7024 Graphite Grey	7026 Granite Grey	7030 Stone Grey	7031 Blue Grey	7032 Grey
7033 Cement Grey	7034 Yellow Grey	7035 Pale Grey	7036 Platinum Grey	7037 Dusty Grey	7038 Agate Grey	7039 Quartz Grey	7040 Window Grey
7042 Traffic Grey A	7043 Traffic Grey B	7044 Silky Grey	7045 Telegrey 1	7046 Telegrey 2	7047 Telegrey 4	8000 Green Brown	8001 Gold Brown
8002 Signal Brown	8003 Clay Brown	8004 Copper Brown	8007 Fawn Brown	8008 Olive Brown	8011 Nut Brown	8012 Red Brown	8014 Sepia Brown
8015 Chestnut Brown	8016 Mahogany Brown	8017 Chocolate Brown	8019 Grey Brown	8022 Black Brown	8023 Orange Brown	8024 Beige Brown	8025 Pale Brown
8028 Earth Brown	9001 Cream	9002 Grey White	9003 Signal White	9004 Signal Black	9005 Jet Black	9010 Pure White	9011 Graphite Black
9016 Traffic White	9017 Traffic Black	9018 Papyrus White					

ANNEX B*(Foreword)***COMMITTEE COMPOSITION**

Gas Cylinder Sectional Committee, MED 16

<i>Organization</i>	<i>Representative(s)</i>
Petroleum and Explosive Safety Organization, Nagpur	SHRI M . K. JHALA (Chairman) SHRI V. K. MISHRA (<i>Alternate I</i>) SHRI JAMUNALAL ROUT (<i>Alternate II</i>)
All India Industrial Gases Manufacturers Association, New Delhi	SHRI SAKET TIKU SHRI K. R. SAHASRANAM (<i>Alternate</i>)
Ashok Leyland Limited, Chennai	SHRI VED PRAKASH GAUTAM SHRI FAUSTINO V. (<i>Alternate</i>) SHRI SUCHISMITA CHATTERJEE (<i>Young Professional</i>)
Automotive Research Association of India, Pune	DR S. S. THIPSE SHRI S. D. RAIRIKAR (<i>Alternate</i>)
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Bhiwadi Cylinders Pvt Ltd, New Delhi	SHRI SUNIL K. DEY
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	COL R. DHANKHAR
Everest Kanto Cylinder Ltd, Mumbai	SHRI GHANSHYAM GOYAL SHRI A. K. KHAMKAR (<i>Alternate I</i>) SHRI A. S. V. S. PRASAD (<i>Alternate II</i>)
Gujarat Gas Ltd, Surat	SHRI RAVI RAVIPALLI
Hindustan Petroleum Corporation Ltd, Kolkata/Mumbai	SHRI DEBASHISH CHAKRAVERTY SHRI PRAVIN MANOHAR HADKE (<i>Alternate</i>) SHRI MANIKANDAN M. (<i>Young Professional</i>)
Ideal Engineers Hyderabad Private limited, Hyderabad	SHRI SATISH KABRA SHRI S. GOPALAIAH (<i>Alternate</i>)
Indian Oil Corporation Ltd, Mumbai	SHRI SHANKAR SHARAN SHRI SANJAY GUPTA (<i>Alternate</i>)
Indraprastha Gas Limited, Delhi	SHRI UJWAL BHANDARI SHRI SUSHIL KUMAR (<i>Alternate</i>) SHRI AVIRAL RAJEEV (<i>Young Professional</i>)
International Industrial Gases Ltd, Howrah	SHRI DEVENDRA K. GARG SHRI NIKHILESH K. GARG (<i>Alternate</i>)
INOX India Limited, Vadodara	SHRI DEEPAK V. PATWARDHAN SHRI DEEPAK V. ACHARYA (<i>Alternate</i>)
Kosan Industries Ltd, Mumbai/Surat	SHRI GIRISHBHAI K. DESAI SHRI S. B. BOLMAL (<i>Alternate</i>)
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LINDE India Ltd, Kolkata	SHRI RAMANA VUTUKURU SHRI PARDEEP (<i>Alternate</i>) SHRI P. R. DEODHAR (<i>Young Professional</i>)

IS 4379 : 2021

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Society of Indian Automobile Manufacturers, New Delhi	SHRI K. K. GANDHI SHRI AMIT KUMAR (<i>Alternate</i>)
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